

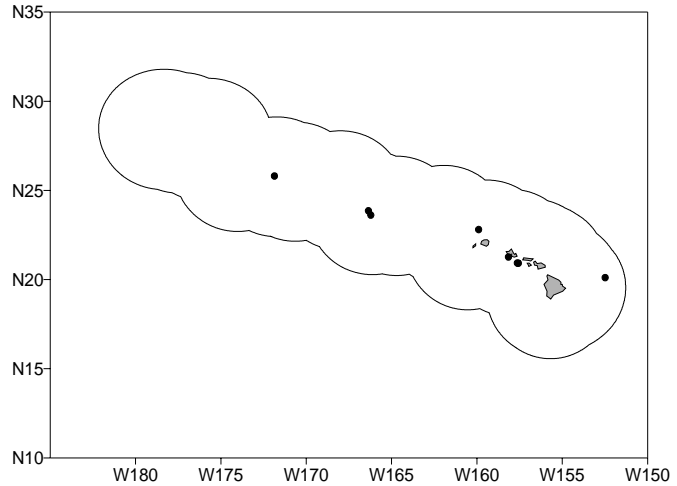
## SPINNER DOLPHIN (*Stenella longirostris*): Hawaiian Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

Spinner dolphins are found throughout the world in tropical and warm-temperate waters (Perrin and Gilpatrick 1994). They are common and abundant throughout the entire Hawaiian archipelago (Shallenberger 1981; Norris and Dohl 1980; Norris et al. 1994), and 26 strandings have been reported (Maldini 2003). Recent sighting locations from a 2002 shipboard survey of waters within the U.S. Exclusive Economic Zone (EEZ) of the around the main Hawaiian Islands (Mobley et al. 2000 Barlow 2003) are shown in Figure 1. There is some suggestion from an intensive study of spinner dolphins off the Kona Coast of Hawaii that the waters surrounding this island may have a large, relatively stable "resident" population (Norris et al. 1994). Currently, it is not known whether spinner dolphins regularly move between islands or island groups, or whether separate populations may exist.

Hawaiian spinner dolphins belong to a stock that is separate from those involved in the tuna purse-seine fishery in the eastern tropical Pacific (Perrin 1975; Dizon et al. 1994). The Hawaiian form is referable to the subspecies *S. longirostris longirostris*, which occurs pantropically (Perrin 1990). For the Marine Mammal Protection Act (MMPA) stock assessment reports, there is a single Pacific management stock including only animals found within the U.S. EEZ Exclusive Economic Zone (EEZ) of the Hawaiian Islands.

Spinner dolphins involved in eastern tropical Pacific tuna purse-seine fisheries are managed separately under the MMPA.



**Figure 1.** Spinner dolphin sighting locations during the 2002 shipboard cetacean survey of U.S. EEZ waters surrounding the Hawaiian Islands (Barlow 2003; see Appendix 2 for details on timing and location of survey effort). Outer line indicates approximate boundary of survey area and U.S. EEZ.

### POPULATION SIZE

Although spinner dolphins are clearly among the most abundant cetaceans in Hawaiian waters, previously available population estimates apply only to the west coast of Hawaii. Norris et al. (1994) photo-identified 192 individuals along the west coast of Hawaii and estimated 960 animals for this area in 1979-1980. Östman (1994) photoidentified 677 individual spinner dolphins in the same area from 1989 to 1992. Using the same estimation procedures as Norris et al. (1994), Östman (1994) estimated a population size of 2,334 for his study area along the Kona coast of Hawaii. As part of the Marine Mammal Research Program of the Acoustic Thermometry of Ocean Climate (ATOC) study, a total of twelve aerial surveys were conducted within about 25 nmi of the main Hawaiian Islands in 1993, 1995 and 1998. An abundance estimate of 3,184 (CV=0.37) spinner dolphins was recently calculated from the combined survey data (Mobley et al. 2000). This abundance underestimates study underestimated the total number of spinner dolphins within the U.S. EEZ off Hawaii, because areas around the Northwestern Hawaiian Islands (NWHI) and beyond 25 nautical miles from the main islands were not surveyed. Furthermore, the data on which this estimate was based are now over 5 years old. A line-transect vessel survey of the Hawaiian archipelago EEZ was completed in 2002 and is expected to provide a more comprehensive estimate of abundance for Hawaiian spinner dolphins in the near future. A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 2,805 (CV=0.66) spinner dolphins (Barlow 2003). This is currently the best available abundance estimate for this stock.

### Minimum Population Estimate

The log-normal 20th percentile of the 2002 abundance estimate is 1,690 spinner dolphins combined 1993-98 abundance estimate is 2,355 spinner dolphins. As with the best abundance estimate above, this includes only areas within about 25 nmi of the main Hawaiian Islands and is therefore an underestimate.

### Current Population Trend

No data on current population trend are available.

### CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No information on current or maximum net productivity rate is currently available for the Hawaiian stock.

### POTENTIAL BIOLOGICAL REMOVAL

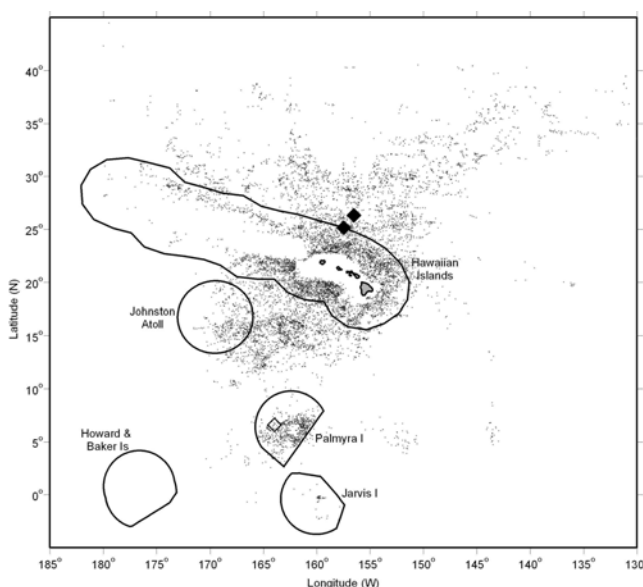
The potential biological removal (PBR) level for this stock is calculated as the minimum population size (2,355,1,690) times one half the default maximum net growth rate for cetaceans ( $\frac{1}{2}$  of 4%) times a recovery factor of 0.50 (for a species of unknown status with no estimated fishery mortality or serious injury within the U.S. EEZ of the Hawaiian Islands; Wade and Angliss 1997), resulting in a PBR of ~~24~~ 17 spinner dolphins per year.

### HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

#### Fishery Information

Information on fishery-related mortality of cetaceans in Hawaiian waters is limited, but the gear types used in Hawaiian fisheries are responsible for marine mammal mortality and serious injury in other fisheries throughout U.S. waters. Gillnets appear to capture marine mammals wherever they are used, and float lines from lobster traps and longlines can be expected to occasionally entangle whales (Perrin et al. 1994). In Hawaii, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993; NMFS/PIR, unpublished data), but no estimate of annual human-caused mortality and serious injury is available, because the nearshore gillnet fisheries are not observed or monitored. ~~Regulations governing the use of nearshore gillnets (lay nets) are currently under review by the State of Hawaii.~~

Interactions with cetaceans have been reported for all Hawaiian pelagic fisheries (Nitta and Henderson 1993). ~~Between 1994 and 2002, two spinner dolphins were observed hooked or entangled in the Hawaii-based longline fishery, with approximately 4-25% of all effort observed (Forney 2004).~~ During the 905 observed trips with 11,014 sets, the average interaction rate of spinner dolphins was one animal per 453 fishing trips, or one animal per 5,507 sets. Neither of the animals caught was considered seriously injured (Forney 2004), based on an evaluation of the observer's description of the interaction and following established guidelines for assessing serious injury in marine mammals (Angliss and Demaster 1998). The average 5-yr estimate of annual mortality and serious injury within the Hawaiian Islands EEZ during 1998-2002 is zero spinner dolphins. One additional unidentified cetacean, which may have been a spinner dolphin, was taken in this fishery within the U.S. EEZ surrounding Palmyra Island (Figure 2, Forney 2004). Since 2001, the Hawaii-based longline fishery has undergone a series of regulatory changes, primarily to protect sea turtles (NMFS 2001). Potential impacts of these regulatory changes on the rate of spinner dolphin takes are unknown. Between 1997 and 2001, two spinner dolphins were observed hooked in the Hawaiian longline fishery (Figure 2), with approximately 4-23% of all effort observed each year. This extrapolates to an average interaction rate of 4.6 (95% CI = 1-15) spinner dolphins per year for the entire fishery (NMFS unpublished data, Kleiber 1999); however, not all interactions with longlines lead to the death or serious injury of cetaceans. Cetaceans may ingest a hook, become hooked in the mouth or other body part, or become entangled in fishing line, causing varying levels of injury. Following the guidelines of a 1997 Serious Injury Workshop (Angliss



**Figure 2.** Locations of observed sets (small dots), spinner dolphin takes (filled diamonds) and possible takes of this species (open diamond) in the Hawaii-based longline fishery, 1994-2002. Solid lines represent the U. S. EEZ.

and DeMaster 1998), small cetaceans that ingest a hook, are hooked in the mouth or head, are swimming abnormally, or are entangled and released trailing gear are considered seriously injured (defined under the MMPA as likely to result in mortality). One of the spinner dolphins, taken outside of the Hawaiian Islands EEZ, was reported to have been hooked in the fluke and was released alive; this animal would not be considered seriously injured. Interaction details are not available for the second spinner dolphin interaction, which occurred within the Hawaiian Islands EEZ, and the severity of injury cannot be determined. Depending on the nature of this injury, the estimate of serious injury or mortality for spinner dolphins in the entire fishery during the five most recent years for which data are available (1997-2001) is either zero or 12 (95% CI = 1-55), or an average of 0-2.3 dolphins per year (NMFS, unpublished data, Kleiber 1999). The same rates apply if only takes within the Hawaiian Islands EEZ are considered. One additional unidentified cetacean that may have been a spinner dolphin was hooked and injured outside the Hawaiian Islands EEZ. The inclusion of this take would not increase the annual rate of serious injury or mortality for spinner dolphins within U.S. EEZ waters.

Interaction rates between dolphins and the NWHI bottomfish fishery have been estimated based on studies conducted in 1990-1993, indicating that an average of 2.67 dolphin interactions, most likely involving bottlenose and rough-toothed dolphins, occurred for every 1000 fish brought on board (Kobayashi and Kawamoto 1995). Fishermen claim interactions with dolphins who steal bait and catch are increasing. It is not known whether these interactions result in serious injury or mortality of dolphins, nor whether spinner dolphins are involved.

### Other Removals

At least 85 spinner dolphins were live-captured in Hawaiian waters from 1962 to 1981 (Shallenberger 1981). The main capture area was around Oahu.

### STATUS OF STOCK

The status of spinner dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. A habitat issue of increasing concern is the potential effect of swim-with-dolphin programs and other tourism activities on spinner dolphins around the main Hawaiian Islands. Spinner dolphins are not listed as “threatened” or “endangered” under the Endangered Species Act (1973), nor as “depleted” under the MMPA. The Hawaiian stock of spinner dolphins is not considered a strategic stock under the 1994 amendments to the MMPA, because the estimated rate of **mortality and serious injury** within the Hawaiian Islands EEZ (~~0-2.3 spinner dolphins per year~~), **is less than the PBR (24) is zero**. However, there is no systematic monitoring of gillnet fisheries that may take this species, ~~and the potential effect of interactions with the Hawaiian longline fishery in international waters is not known~~. Insufficient information is available to determine whether the total fishery mortality and serious injury for spinner dolphins is insignificant and approaching zero mortality and serious injury rate.

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